Electrical operating instructions

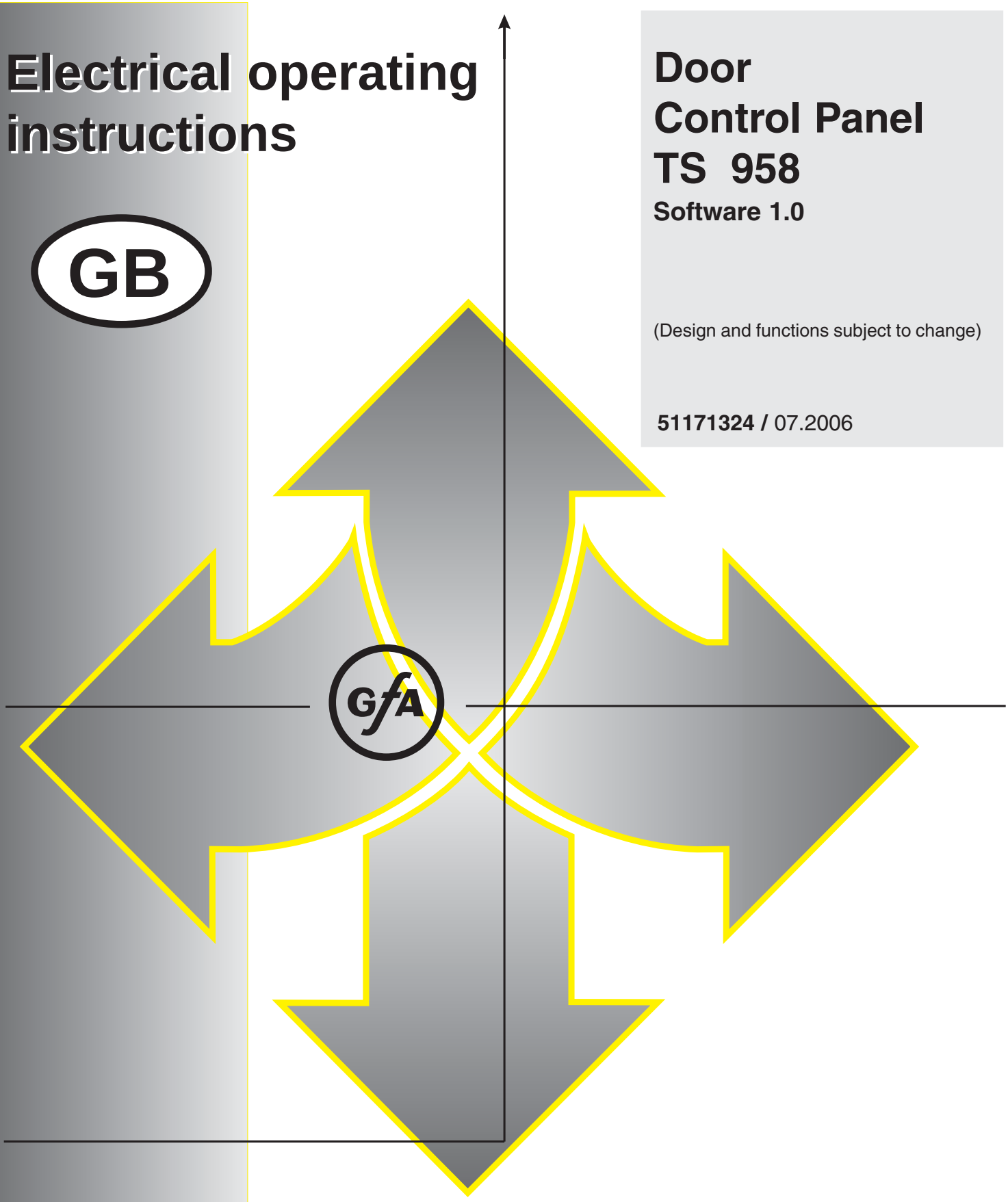
GB

Door Control Panel TS 958

Software 1.0

(Design and functions subject to change)

51171324 / 07.2006



ELEKTROMATEN®

DIN EN ISO 9001:2000
Zertifikat: 01 100 5118

OPERATING INSTRUCTIONS

Page

SAFETY DIRECTIONS 4

INSTALLATION ADVICE 6

INSTALLATION OVERVIEW 7

ENCLOSURE INSTALLATION 8

CONNECTING THE CONTROL AND THE ELEKTROMATEN® 8

MAINS SUPPLY 9

PHASE ROTATION 10

MOTOR CONNECTION (internal wiring) 10

RAPID ADJUSTMENT OF THE LIMITS 11

HARDWARE OVERVIEW 12

WIRING DIAGRAM 13

CONTROL PROGRAMMING 14

- Operating mode 15
- Door position 15
- Functions 15
- Safety functions 15
- Maintenance cycle counter 16

MEMORY CHECK 17

RESET 17

SAFETY DEVICES 18

- Mounting the spiral cable X2 18

Page

Emergency stop X3 18

FUNCTION DESCRIPTION 18

Internal push button / Three push button / Key switch X5 18

Fully closed control 18

Potential free changeover contact X9 18

Door overload monitor 19

Maintenance cycle counter 20

Short circuit / overload monitor 20

OPERATING STATUS DISPLAY 20

TECHNICAL DATA 22

DECLARATION OF INCORPORATION 23

FUNCTION OVERVIEW 24

SAFETY DIRECTIONS

Basic Directions

This control has been built in accordance with **DIN EN 12453 Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements and DIN EN 12978 Industrial, commercial and garage doors and gates - Safety devices for power operated doors - Requirements and Test methods;** and left the factory in perfect condition from the point of view of safety. To maintain this condition and to ensure safe operation, the user must observe all the directions and warnings contained in these operating instructions.
In principle, only trained electrical craftsmen should work on electrical equipment. They must assess the work which has been assigned to them, identify potential danger sources and take suitable safety precautions.
Reconstruction of or changes to TS 958 are only permissible with the approval of the manufacturer. Original replacement parts and accessories authorised by the manufacturer guarantee safety. Liability ceases to apply if other parts are used.
The operational safety of an TS 958 is only guaranteed if it is used in accordance with the regulations. The limiting values stated in the technical data should not be exceeded under any circumstances (see corresponding sections of the operating instructions).

Safety Regulations

During the installation, initial operation, maintenance and testing of the Control Panel, it is necessary to observe the safety and accident-prevention regulations valid for the specific application.

In particular, you should observe the following regulations (this list is not exhaustive):

European normative

- DIN EN 12445
  Safety in use of power operated doors - Test methods
- DIN EN 12453
  Safety in use of power operated doors - Requirements
- DIN EN 12978
  Industrial, commercial and garage doors and gates -
  Safety devices for power operated doors - Requirements and Test methods

Please check normative´s bellow.

VDE-regulations

- DIN EN 418
  Safety machinery
  Emergency stop equipment functional aspects
  Principles for design
- DIN EN 60204-1 / VDE 0113-1
  Safety of machinery - Electrical equipment of machines - Part 1:
  Prescriptions générales
- DIN EN 60335-1 / VDE 0700-1
  Safety of household and similar electrical appliances - Part 1:
  General requirements

Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

SAFETY DIRECTIONS

Explanation of warnings

These operating instructions contain directions which are important for using the ELEKTROMATEN® appropriately and safely.

The individual directions have the following meaning:

DANGER
This indicates danger to the life and health of the user if the appropriate precautions are not taken.

CAUTION
This warns that the ELEKTROMATEN® or other materials may be damaged if the appropriate precautions are not taken.

General warnings and safety precautions

The following warnings are to be understood as a general guideline for working with the ELEKTROMATEN® in conjunction with other devices. These directions must be observed strictly during installation and operation.

Check that all screw connections are secure before operating the control and adjusting the limit switches.

- Please observe the safety and accident prevention regulations valid for the specific application.
- The ELEKTROMATEN® must be installed with the authorised coverings and protective devices. Care should be taken that any seals are fitted correctly and screw couplings are tightened correctly.
- In the case of ELEKTROMATEN® with a permanent mains connection, an all-pole main switch with appropriate back-up fuse must be provided.
- Check live cables and conductors regularly for insulation faults or breakages. When a fault is detected in the cabling, the defective cabling should be replaced after immediately switching off the mains supply.
- Before starting operation, check whether the permissible mains voltage range of the devices corresponds to the local mains voltage.
- With three – phase motor connection it must have right phase rotation

INSTALLATION ADVICE

After the ELEKTROMATEN® is fitted we recommend the following procedure to rapidly reach a fully functioning door.

- Installation **Enclosure installation** page 8
- Installation **Wiring the Drive to the Control** page 8
- Check **Mains supply** page 9
- Check **Phase rotation** page 10
- Programming **Rapid limit adjustment** page 11

The door is ready to work.

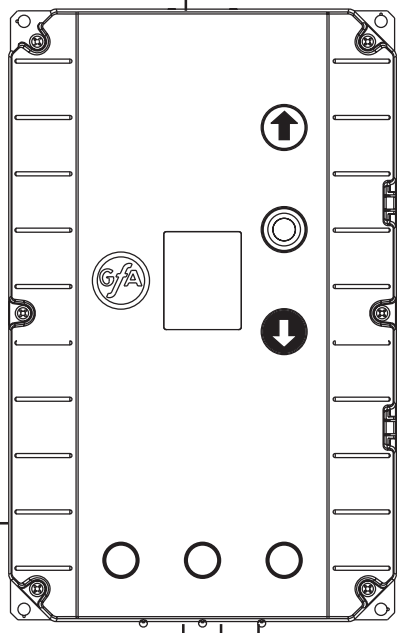
- Installation **Spiral cable** (if required) page 13, 18
- Programming **Door functions** page 14

Check connection of external devices e.g. push button etc.
Overview to connect external devices see diagram (page 13).
After the devices are connected the programming of the control panel must be finalised. (page 14).

INSTALLATION OVERVIEW

Important!
Using the connection cable out side the building is not permitted.

Connection cable ELEKTROMAT® for Motor and DES (electronic limit) 11



Spiral cable 2

Three push button 5

Emergency stop 3

Switch contact potential free 3

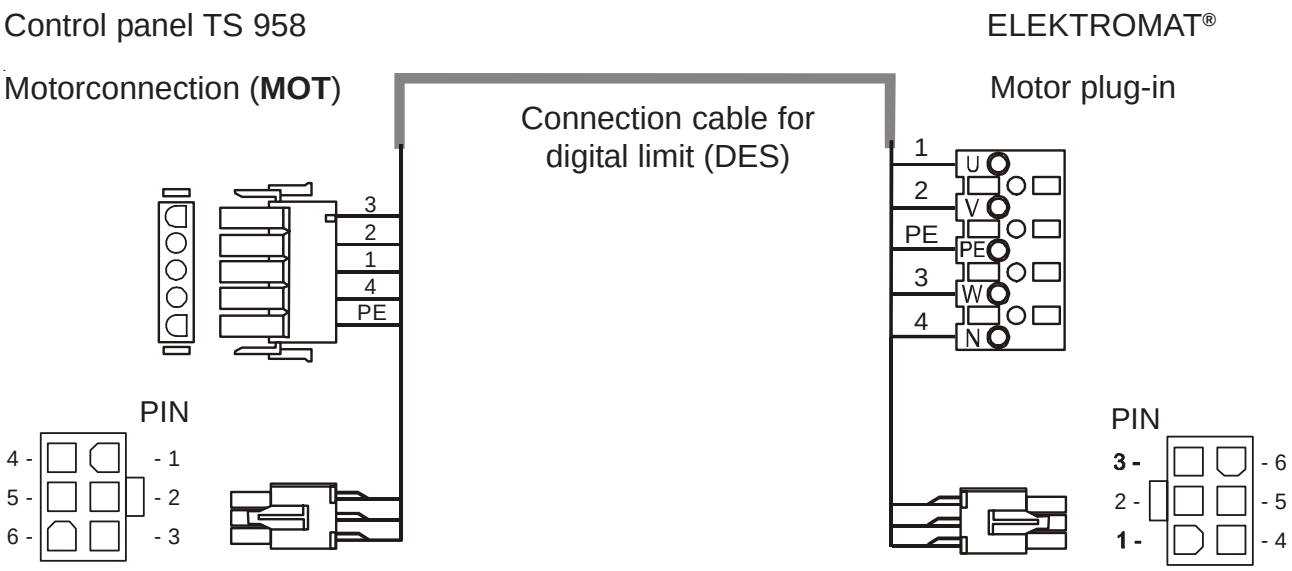
( ) Number of cores in the cable

ENCLOSURE INSTALLATION

Before mounting the enclosure, the surface has to be checked for flatness, slope and freedom from vibrations. Mounting must be vertical. It is important that the door can be clearly seen from the position of the control through-out its travel.

CONNECTING THE CONTROL AND THE ELEKTROMATEN®

After the drive and control are fitted they can be connected with a plug-in cable. The cable has plugs on each end and for easy fitting. The plugs for motor and control panel are different and cannot be interchanged.



Cable identification

Motor plug to control unit

PIN	-	Wire-No.	Excution:
1	-	3	Phase W
2	-	2	Phase V
3	-	1	Phase U
4	-	4	Neutral (N) (if available)
5	-	PE	Earth

Limit plug-in to control panel TS 958 (**DES**)

PIN	-	Wire-No.	Excution:
1	-	5	Safety chain 24V DC
2	-	6	RS485 B
3	-	7	GND
4	-	8	RS485 A
5	-	9	Safety chain
6	-	10	8V DC

MAINS SUPPLY

The CONTROL PANEL TS 958 has a universal electric supply and works with the following supplies. (See diagram Fig.1-5)

External fuse!
External fuse in the main supply should be max. 10A delayed.

The supply disconnect device (Main switch or CEE plug) must be installed between 0,6m and 1,7m above floor level.

DANGER! To the life and health thru electric shock.
Before mounting the mains supply must be switched OFF.

With terminal 1.5, 1.6 und 1.7 the mains supply input can be selected.
For 400V – mains supply the bridge 1.5 to 1.6 must be fitted
For 230V - mains supply the bridge 1.6 to 1.7 must be fitted.

Important note!
The bridge must be fitted into the right terminal otherwise the print could be destroyed.

Mains supply terminal

Fig.: 1

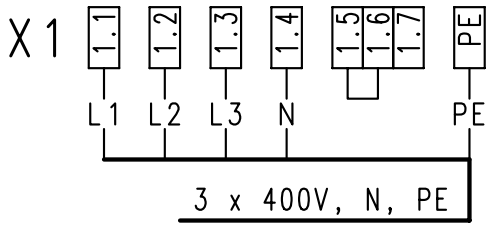


Fig.: 2

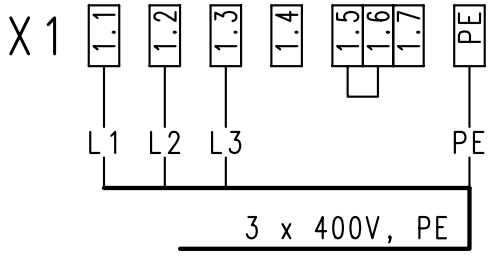


Fig.: 3

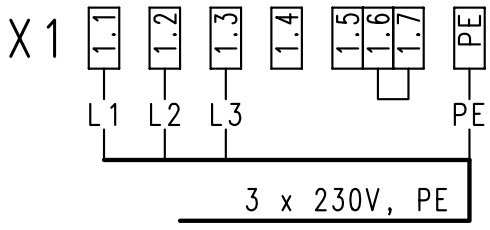
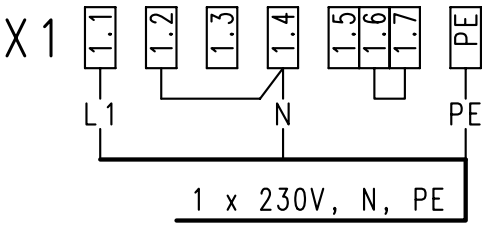
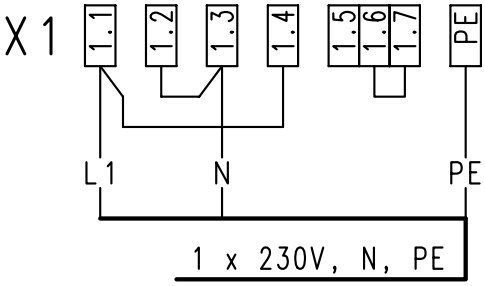


Fig.: 4



symmetric winding

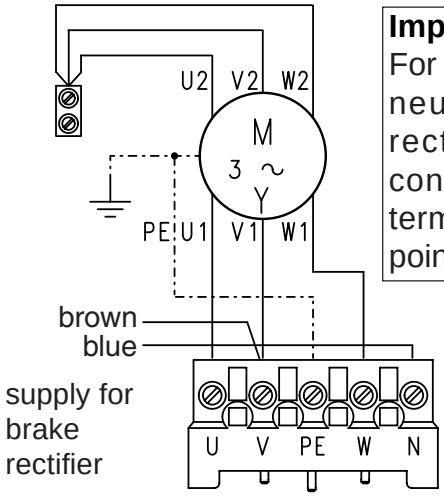
Fig.: 5



asymmetric winding

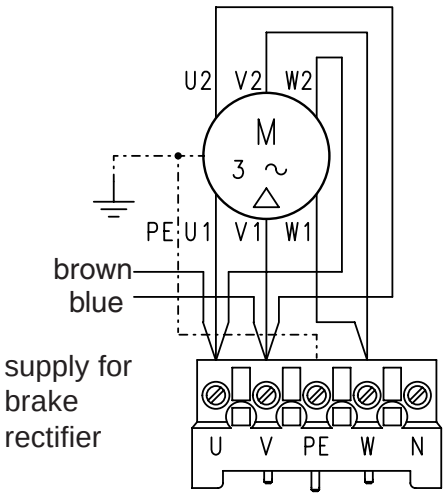
MOTOR CONNECTION (internal wiring)

Three-phase 3 x400 V AC, N, PE
Star connection

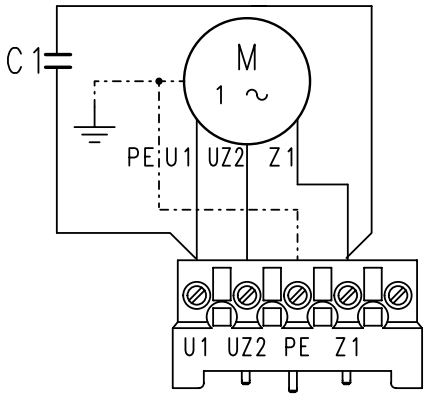


Important note!
For 3x400V AC PE no neutral, the brake rectifier must be connected between terminal V and star-point terminal.

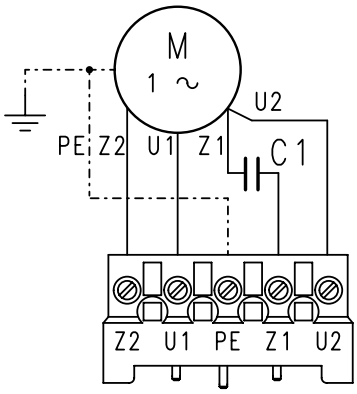
Three-phase 3 x230 V AC, N, PE
Delta connection



Single-phase 1x230 V AC, N, PE
symmetrical winding



Single-phase 1x230 V AC, N, PE
asymmetrical winding



On several ELEKTROMATEN® the connection U1 und V1 on the motor-plug are interchanged.

PHASE ROTATION

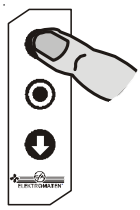
Important Notice!
After the Mains supply has been connected by inserting the CEE plug in the appropriate socket or turning on the main switch, confirm that the phase rotation is correct by checking that the door opens when the OPEN push button is operated.
If the door closes when operating the OPEN push button reverse two phases at the terminal X1.

DANGER! To the life and health through electric shock.
Before changing phase rotation the mains supply must be switched OFF.

RAPID ADJUSTMENT OF THE LIMITS

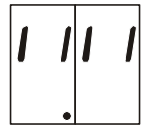
When the phase rotation has been checked the Rapid limit adjustment can be made.
The final setting can be made with the fine adjustment (Control Programming page 15).
Safety limits and pre-limits are automatically adjusted.

1. Setting final limit open



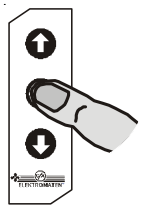
Door open

press button to reach upper limit

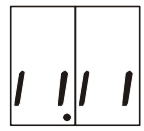


Display
blinking

2. Memorise the final limit open

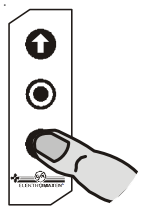


Press stop-button for 3 sec. until
the display changes



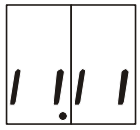
Display
changes

3.Setting the final limit close



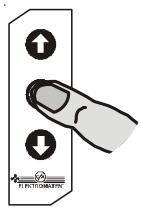
Door close

press button to reach lower limit

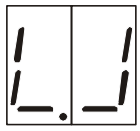


Display
blinking

4. Memorise the final limit close



Press stop-button for 3 sec. until
the display changes

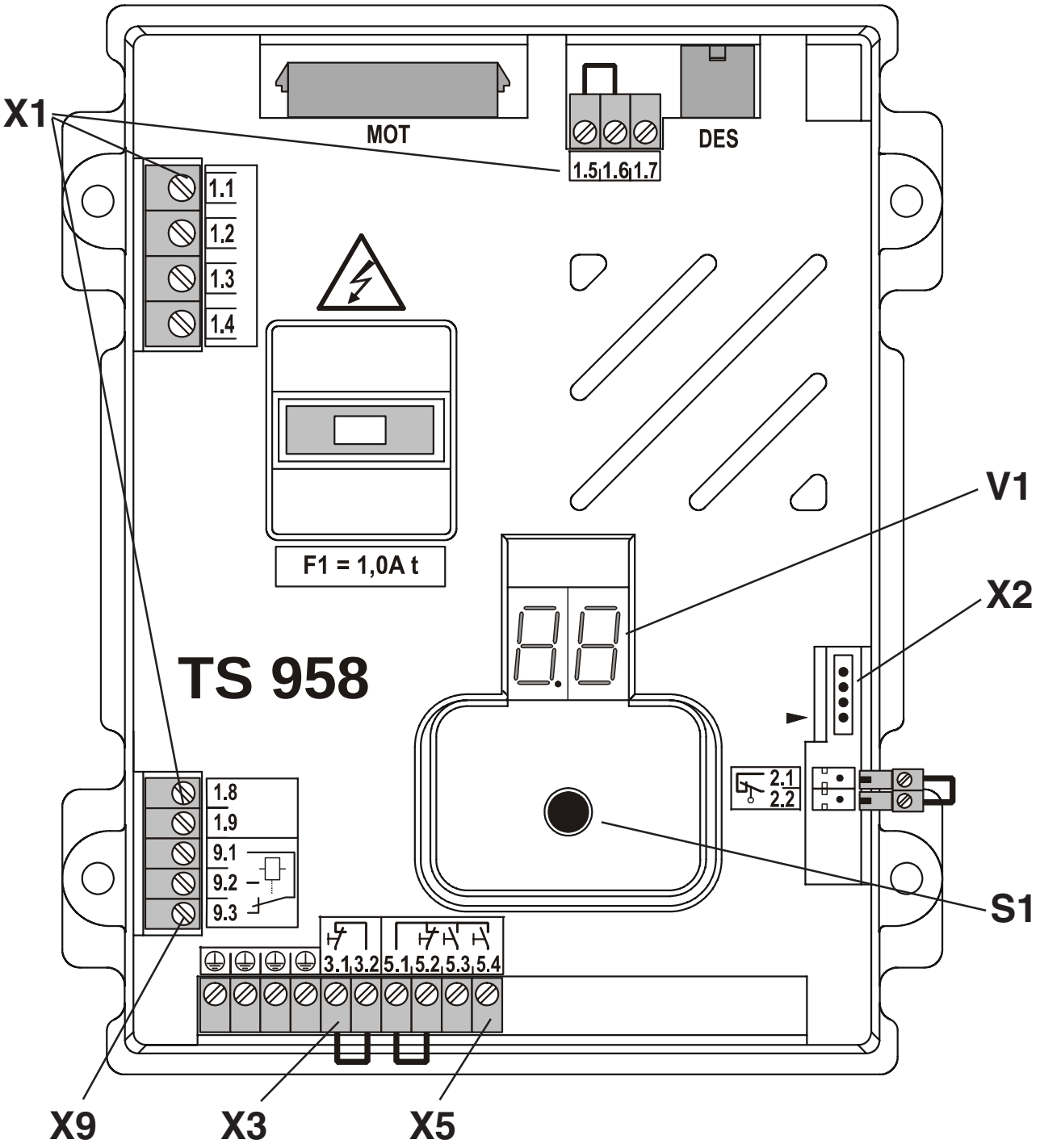


Display
changes

The Rapid adjustment is finished

The door could be moved in DEADMAN mode UP/DOWN
Further adjustments see programming mode

HARDWARE OVERVIEW

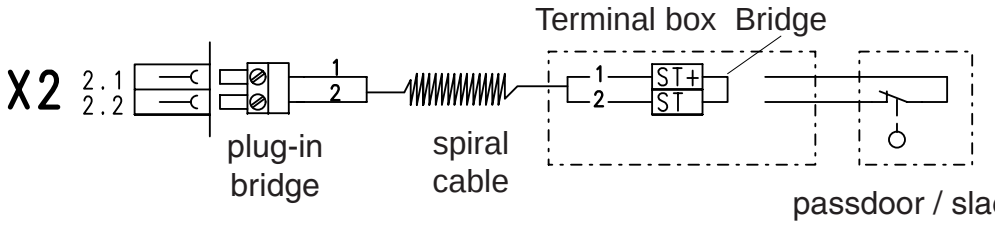


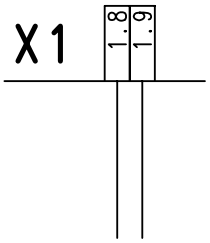
Description Print:

X1 Mains supply
external supply 230V
1.9 = L1 fused with F1 = 1A
1.8 = N
(only with 3 x 400V, N, PE und 1 x 230V, N, PE)
X2 Safety edge system and pass-door plug
X3 Emergency push-button
X5 Three push button / key switch
X9 Potential free relay contact

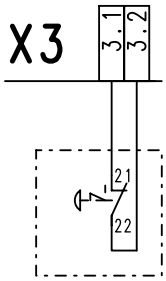
S1 Selector switch
V1 7-segment display
MOT Motor connection
DES Limit connection
► Internal push button

WIRING DIAGRAM

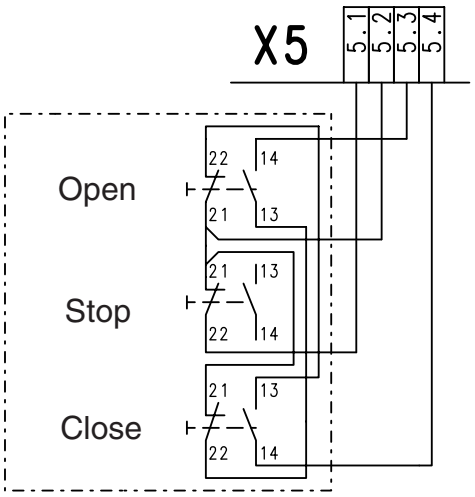




N L1
L1 fused via
F1 = 1At

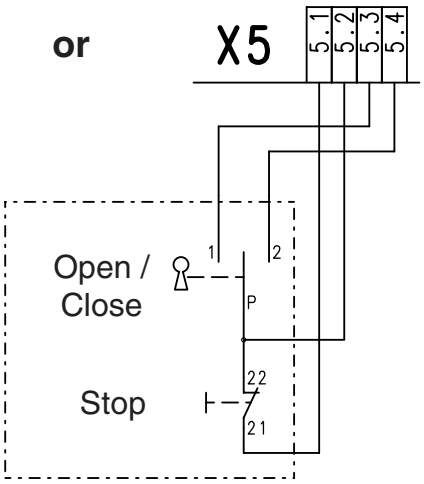


Emergency stop button



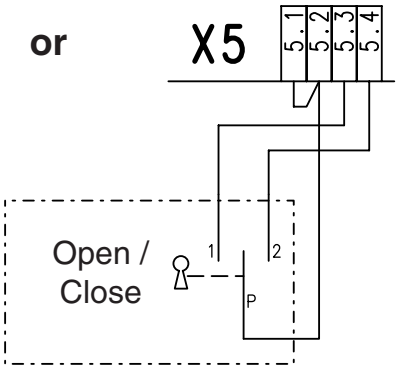
Three push button station

or

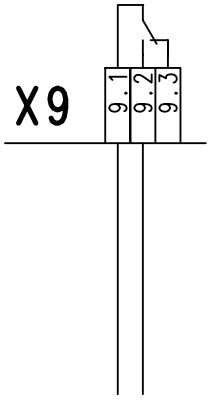


Key switch with stop button

or



Key switch intermediate stop

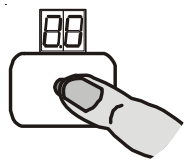


Aux. contact

Page 18 - 19

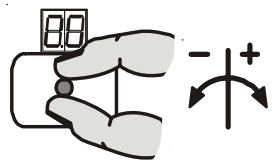
CONTROL PROGRAMMING

1. Enter programming Mode



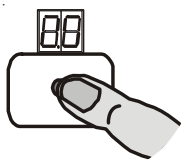
Press selector switch for 3 sec. until **display = 00**

2. Chose program and confirm



Turn selector

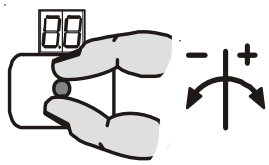
and



Press selector

3. Adjustment

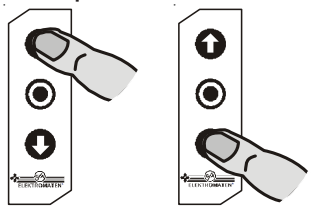
Functionen



Turn selector

or

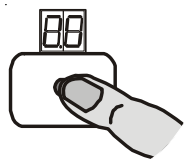
Door position



Press foil buttons

4. Memorise

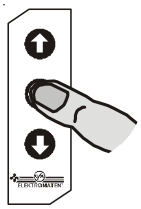
Functionen



Press selector

or

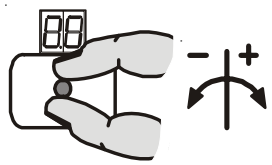
Door position



Press stop-button

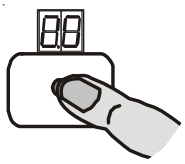
further adjustments

5. Exit programming



Turn selector until display = 00

and



Press selector

CONTROL PROGRAMMING

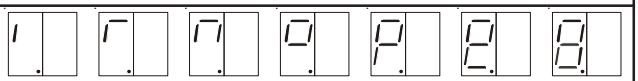
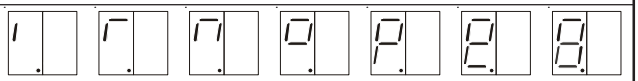
2. Choose program and confirm	**3.** Adjustment	**4.** Memorise
Operating mode		
01 **Door function**	**Dead man OPEN** **Dead man CLOSE**	**Press selector**
	02 **Self-hold OPEN** **Dead man CLOSE**	
	05 **fully closed control**	
Door position		
11 **Final limit open coarse adjustment**	**Move door upwards or downwards**	**Press stop Button**
12 **Final limit close coarse adjustment**	**Move door upwards or downwards**	**Press stop Button**
13 **Final limit open fine adjustment**	01 **Final limit open can change without door movement using +/-**	**Press selector**
14 **Final limit close fine adjustment**	01 **Final limit close can change without door movement using +/-**	**Press selector**
17 **Relay switch position**	**Move to relay switch position**	**Press stop Button**
Functions		
25 **Relay function**	01 **OFF**	**Press selector**
	1 **Switch contact impulse signal**	
	2 **Switch contact continuous**	
Safety functions		
31 **Door overload monitor**	01 **OFF**	**Press selector**
	1 **sensitive**	
	2 **insensitive**	

See page 11: Limit switch rapid - Adjustment

CONTROL PROGRAMMING

2. Chose program and confirm		**3.** Adjustment	**4.** Set
Maintenance cycle counter			
Counter adjustment		01-99 correspond from 1.000 up to 99.000 count down cycles	Press selector
Reaction when reaching 0		Display appears „CS“ and adjusted number of cycles Changing to Hold-to-run mode in upwards direction, if adjusted Menu 0.1 door function	Press selector

MEMORY CHECK

2. Chose program and confirm		Displayed
01 **Info Cycle counter 7- digit**	**Press selector**	 **M HT ZT T H Z E** **The cycles would be displayed as follow.** **M = 1.000.000 H = 100** **HT = 100.000 Z = 10** **ZT = 10.000 E = 1** **T = 1.000**
02 **Info last 2 faults**	**Press selector**	**Last 2 faults would be alternately displayed.**
03 **Info Program changes 7- digit**	**Press selector**	 **M HT ZT T H Z E** **The Number of program changes would be displayed as follow.** **M = 1.000.000 H = 100** **HT = 100.000 Z = 10** **ZT = 10.000 E = 1** **T = 1.000**
04 **Info Program version**	**Press selector**	**Program version will be displayed**

RESET

2. Chose program and confirm	**3.** Adjustment		**4.** Set
05 **RESET except cycle- and Program change counter**	⇧⇩	11 **Reset**	◉ **Press stop button 3 sec.**

SAFETY DEVICES

Mounting the spiral cable X2

A bush is provided on both sides of the control box for mounting the spiral cable.
Push the plugs through, into the enclosure until there is sufficient cable to allow the plug to be connected to the board.
If passdoor / slack wire switch contact exists, remove bridge at terminal ST and ST+ in the terminal box. The plug at terminal X2 must be removed.

Emergency stop X3

These terminals are to connect an emergency stop button according to DIN EN 418. Alternatively the terminals can be used to connect a safety device against entrapment (e.g. self-testing light barrier).

FUNCTION DESCRIPTION

Internal push button / Three push button / Key switch X5

Internal and external push button
Internal and external push button working seperately from each other. Pushing at the same time, the internal push button has priority.

Important note!
In Dead man mode the user shall be in full view of the door throughout its travel.

Fully closed control

At this function the self-hold should be activate. The pushbutton must be pressed until the shutter reaches the final limit. Otherwise the door opens in self-hold automatically.
To activate this function, set **Menu 0.1 Adjustment 0.5**.

Potential free changeover contact X9

In **Menu 2.5** this contact is able to work for several functions.

Important note!
It is only possible to work with one adjusted function.

When activating the switching point the shutter must be moved to the point. **Menu 1.7** must be activated.

FUNCTION DESCRIPTION

Door overload monitor

The door overload monitor recognises that a person is being lifted by the door (hanging on a handle, etc.) and could be adjusted within **Menu 3.1** with a possibility of two steps of sensitivity. Adjustment 0.1 sensitive reaction and adjustment 0.2 insensitive reaction

Important!
After programming the force monitoring the door must perfom a complete opening and closing cycle without an interruption.
Durich which the system reads the increments to calculate the way.

Important Note!
To have a trouble-free service the following points must be checked:
- The door must be correctly balanced
- The cable drum diameter should not be less then 160mm

Environmental influences e.g. temperature or wind load can cause the overload monitor to be activated.

The overload monitor is a self-learning system, and checks the system from 5 cm up to ca. 2,0 m, slow-occurring changes e.g. spring tension will be automatically recognised and equalized.

Important Note!
The overload monitor does not take place against other safety devices e.g. (safety against entrapment)

When an overload is detected the door works only Dead man Mode in the UP and DOWN direction.
The control unit automatically resets to impulse control when a final limit position has been reached.

FUNCTION DESCRIPTION

Maintenance cycle counter

Free adjustable maintenance cycle counter **Menu 8.5** makes it possible to pre-adjust a max. No of cycles until a maintenance is agreed.
The no of cycles can be adjusted from 1.000 up to 99.000; the adjustment is possible in steps of 1.000 cycles.
Different reactions can be chosen if the point of pre- adjusted maintenance cycles has been reached, see **Menu 8.6**
Whenever the final open limit has been contacted the pre-adjusted number will be reduced with 1 until 0 is reached.
When maintenance was done the cycle counter could be re-adjusted to a new maintenance period and count down starts again.

Short circuit / overload monitor

The TS 958 control panel delivers 2 supplies for external devices.

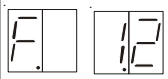
230V AC; max. 1A

24V DC; max. 150mA

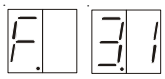
If the 24V DC supply is short-circuited or overloaded, the red point in the display goes out.
If the display is out, fuse F1 must be checked.

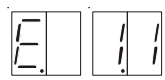
OPERATING STATUS DISPLAY

The control TS 958 can display up to three different status conditions one after another. Each status is displayed with a letter and a number. The letter and the number are flashing alternately, thereby the control differentiates between a FAULT = **F** and a command = **E.**

Report	Description	Measure to solve the problem
	**Pass door contact open**	**Check the proper operation of pass door contact, or whether the supply cable is broken**
	Emergency operator or motor-winding thermal protection operated	**Check emergency operator or whether the drive unit is overloaded.**
	Emergency stop activated	**Check the emergency stop is activated, or whether the supply cable is broken**
	Failure pass door contact X 2.1- X 2.2 or control voltage circuit less than 24V	**Check pass door circuit's transition resistance and weather pass door switch works; verify the voltage is OK at 24V terminal to GND**
	Failure input pass door X 2.1- X 2.2	**For reset switch control panel OFF-ON**

OPERATING STATUS DISPLAY

Report	Description	Measure to solve the problem
	Safety open limit operated	Turn mains supply OFF and move the shutter downwards - with the manual operator- until the safety limit is free or the open limit should be re-adjusted.
	Safety close limit operated	Turn mains supply OFF and move the shutter upwards - with the manual operator- until the safety limit is free or the close limit should be re-adjusted.
	Door load monitor has activated	Check the door mechanism for tightness
	ROM - Fault	Reset by switching OFF or change the control
	Internal fault report	Reset by switching OFF or change the control
	RAM - Fault	Reset by switching OFF or change the control
	Internal control fault	Reset by switching OFF or change the control
	DES – no response	Check electronic limit DES connection. Reset by switching OFF or change the control or the electronic limit.
	Drive unit does not work	Check the shutter mechanics. Check the limit shaft for function (turning) Check phase rotation.
	Phase rotation failure	Check main supply phase rotation turns right

Report	Command description
	open command being given
	stop command being given
	close command being given

	If the normally displayed red spot is out = Short circuit or overload on the 24V supply

TECHNICAL DATA

Housing Dimensions	190mm x 300mm x 115mm (W x H x D)
Mounting	vertical
ELEKTROMATEN® Supply	Three-phase 3 x 230 / 400V AC ± 5%, 50...60Hz Single-phase 1 x 230V ± 5%, 50...60Hz Power max. at 3 x 400V AC, max. 3kW
Control supply via L1,L2	400V AC or 230V AC + - 10%, 50-...60Hz, voltage changing with bridge to 3- pole terminal, safety fuse F1 (1A t)
External supply fuse	10A delayed
Permitted Load	ca. 15 VA (without motor and ext. 230V)
External supply 1	230V via L1 and N, safety fuse F1 (1A t)
External supply 2	24V DC uncontrolled, max. Load 150mA, Protected via electronic fase
Inputs	24V DC / typ. 10mA signal length must be more than 100ms
Relay output	If inductive loads are to be switched (e.g. other relays) those have to be protected with free-wheeling Diodes contact load at 230V max. 1A
Temperature	Working: +0.... +40°C Storage: +0....+50°C
Humidity:	To 93% not condensing
Vibration:	Vibration free mounting, e.g. on flat built wall
Protection class	IP54 (CEE Plug), IP65 available

DECLARATION OF INCORPORATION

according to
EC guidelines 98/37/EC
Low voltage guideline 73/23/EEC
with amendments
Electromagnetic compatibility 89/336/EEC
with amendments

ELEKTROMATEN®
GfA - Gesellschaft für Antriebstechnik
Dr.-Ing. Hammann GmbH & Co. KG
Wiesenstr. 81

40 549 Düsseldorf (Heerdt)

We, the

GfA - Gesellschaft für Antriebstechnik

Wiesenstr. 81, 40549 Düsseldorf (Heerdt), Germany

hereby declare that the following products conform with the above EC guidelines and are only intended for installation in door equipment.

Product description: **Door Control Panel TS 958**

Harmonised norms applied

- **DIN EN 12543**
  Safety in use of power operated doors
  - Requirements

- **DIN EN 12978**
  Industrial, commercial and garage doors and gates -
  Safety devices for power operated doors
  - Requirements and Test methods

The machinery to which this Declaration of Incorporation relates must not be put in to service until the relevant machinery into which is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Düsseldorf, 17. 07. 2006

(GL, Müller) (QMS, U. Hohns)

FUNCTION OVERVIEW

- **Control panel for ELEKTROMATEN®** up to. 3 kW at 400V / 3~ with electronic limit **DES** designed for only low-level adjustment

- **7- Segment led display showing**
  - Programming the control panel
  - Displays Command - / Info- / Fault

- **Mains supply**
  - 400V / 3~ with and without Neutral
  - 230V / 3~
  - 230V / 1~ (for single-phase motors)

- **Door operating modes**
  - Dead-man open- and close
  - Self-hold open- and dead-man mode close
  - Fully closed control

- **supply for external devices**
  - 230V (at 400V / 3~ with N), up to 1A load
  - 24V DC, up to 150mA load

- **Plug for 5 pole motor connector 6 pole for electronic limit DES**

- **Plug for spiral cable pass-door contact**

- **integrated internal pushbutton OPEN / STOP / CLOSE**

- **Additional terminals for different control equipment**
  - Emergency stop (LATCHING)
  - additional safety stops
  - external three push button OPEN / STOP / CLOSE
  - Key switch (latching) for intermediate Stop
  - 1x potential free relay output (NC / NO), switching contact continous or impulse